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Takegawa et al.

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(54) **ROTATION STOPPER FOR CYMBAL PAD**

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G10D 13/06 (2020.01)

(52) **U.S. Cl.**
CPC ***G10D 13/06*** (2013.01)

(58) **Field of Classification Search**
CPC G10D 13/06
See application file for complete search history.

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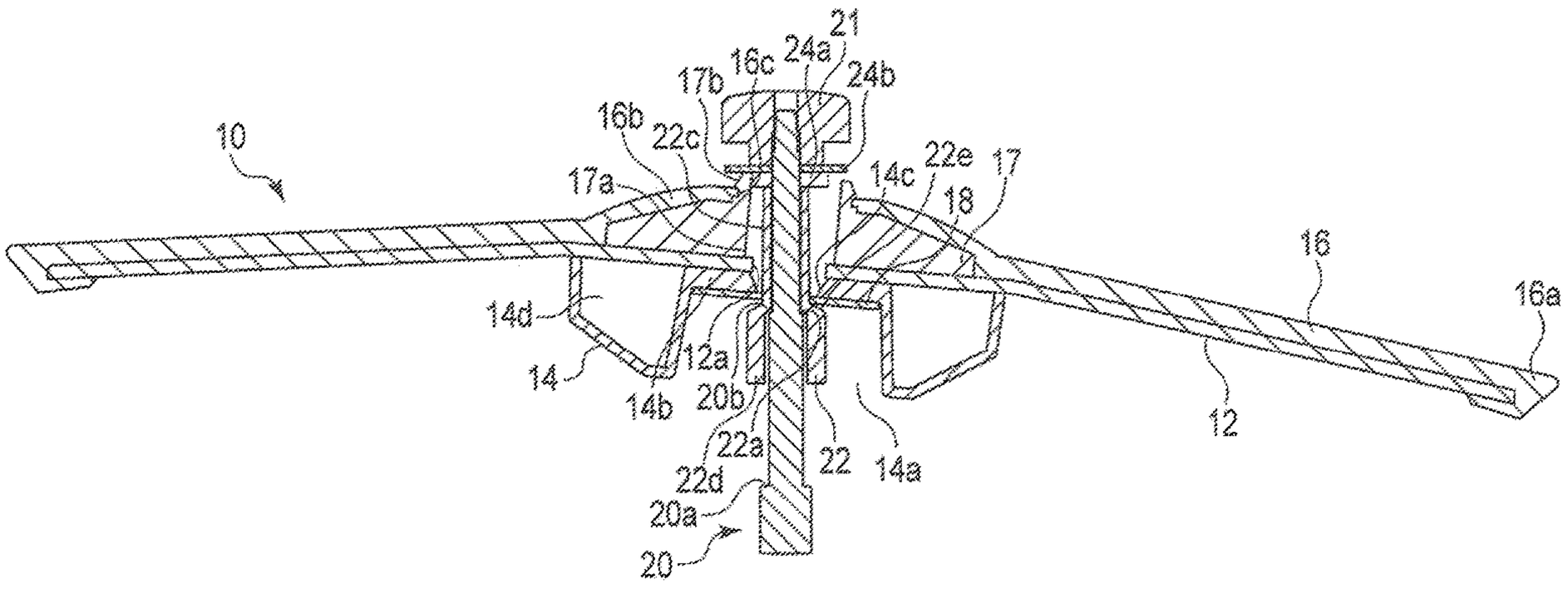
(57) **ABSTRACT**

One aspect of the rotation stopper (**1**) for the cymbal pad (**10**) has a holding hole (**19**) provided in a holding plate (**18**) of the cymbal pad (**10**) and a holding sleeve (**22**) provided on a supporting rod (**20**) of a cymbal stand. The holding sleeve (**22**) is arranged to be inserted through the holding hole (**19**) with an amount of play in the fitting. The holding hole (**19**) has a plurality of engaging recesses (**34**) on the inner periphery. The holding sleeve (**22**) has an outer peripheral surface having at least one ridge (**33**) that engages with at least one of the engaging recesses (**34**) so as to deter the cymbal pad (**10**) from rotationally moving relative to the holding sleeve (**22**).

10 Claims, 5 Drawing Sheets



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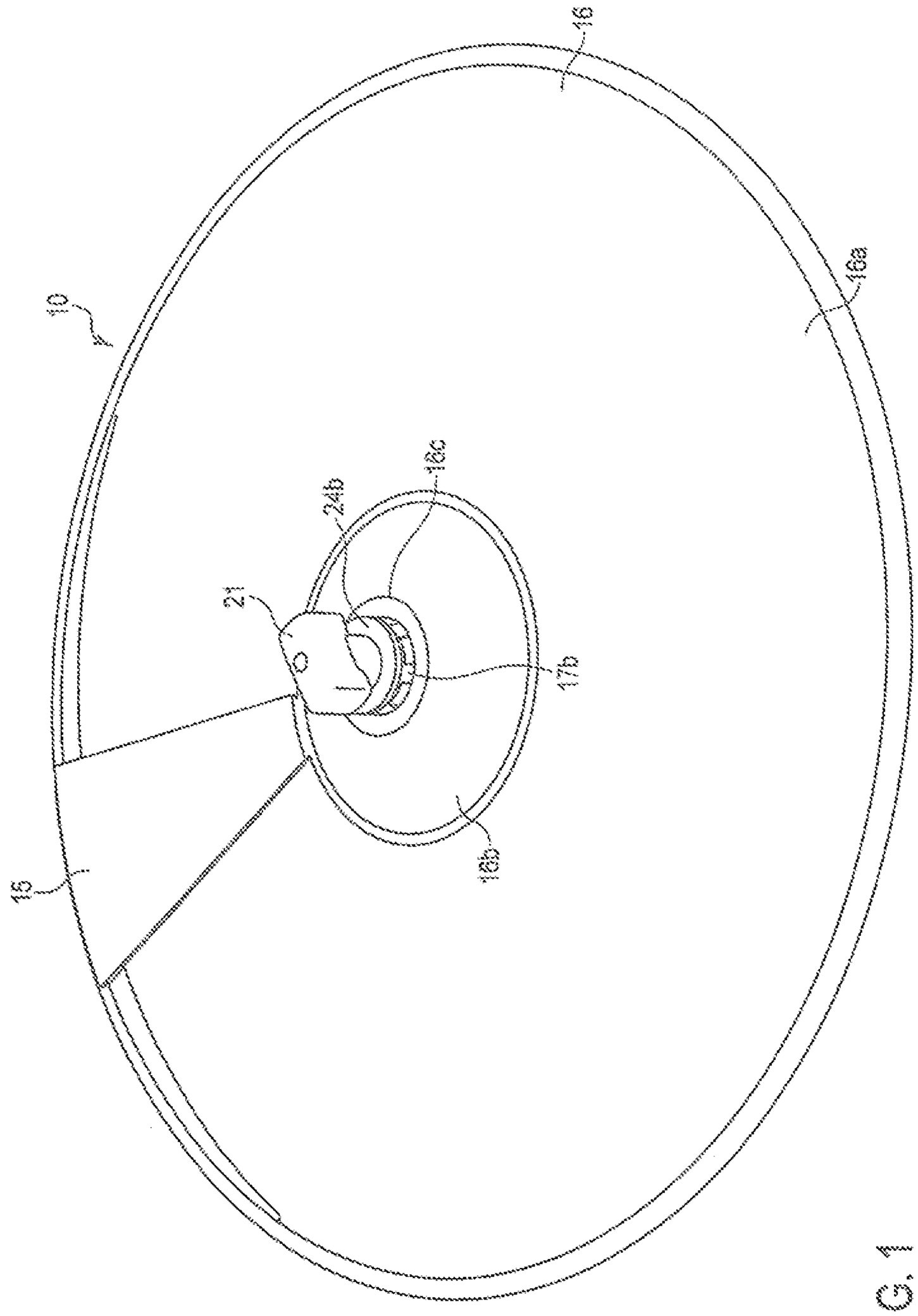


FIG. 1

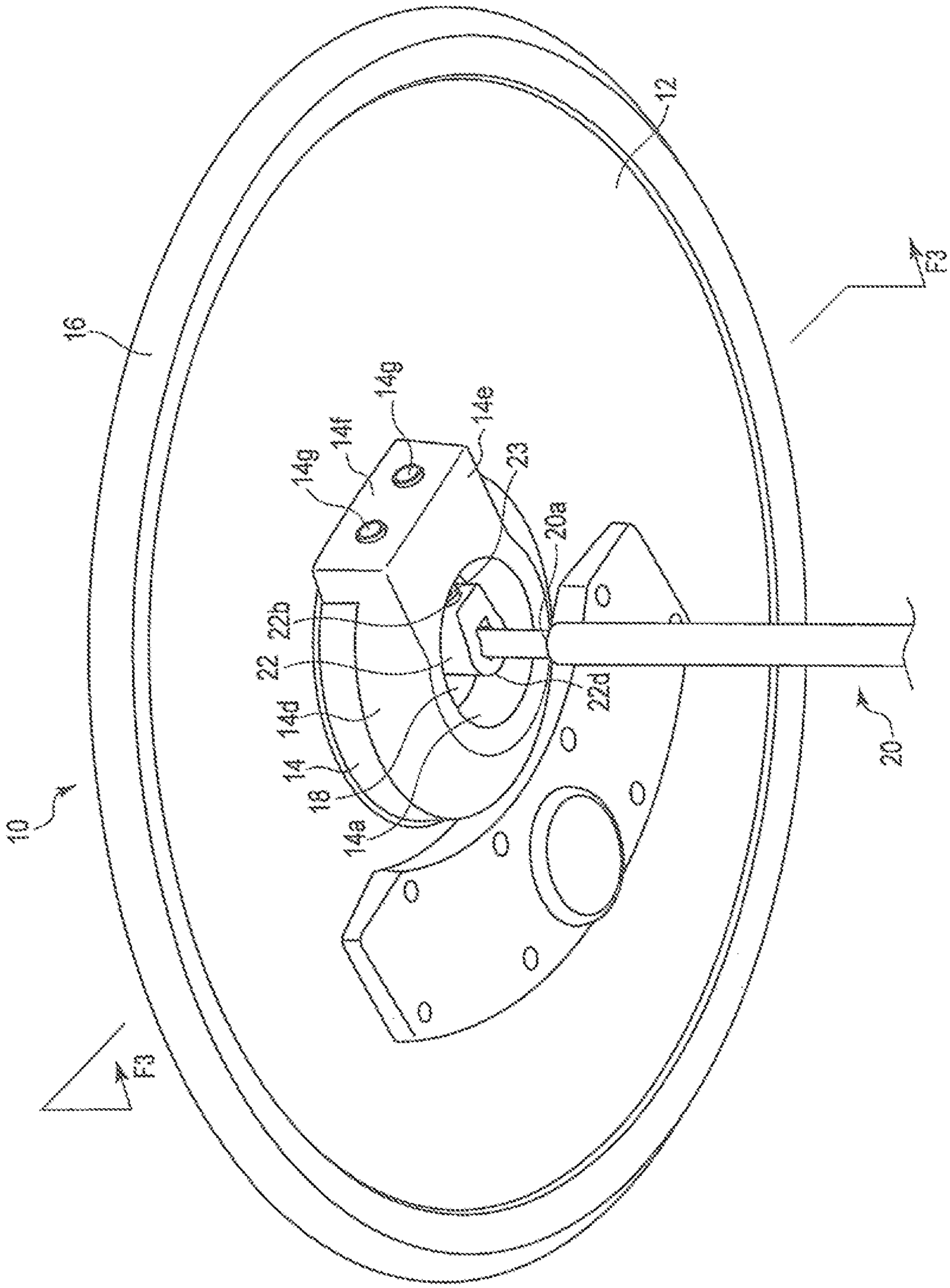
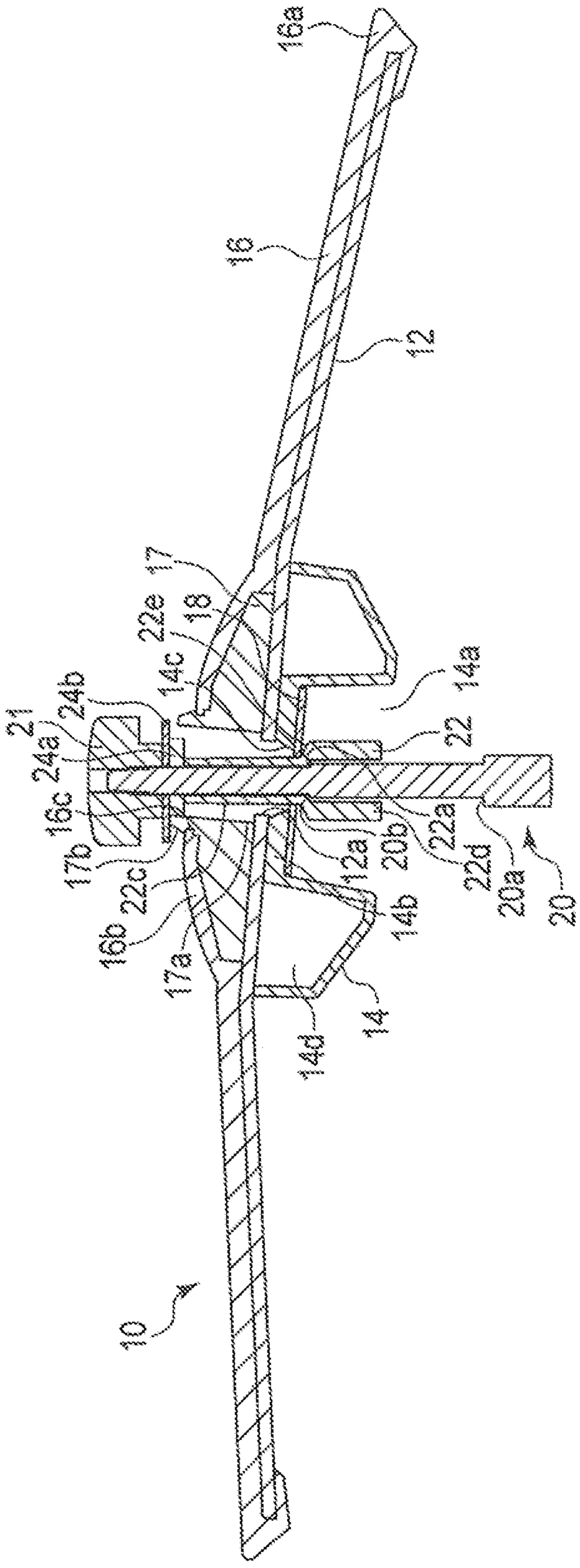


FIG. 2


18a
16
12
22e
17
18
14c
14a
21
24b
24a
22
16c
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20
16b
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14d
10a

FIG. 3

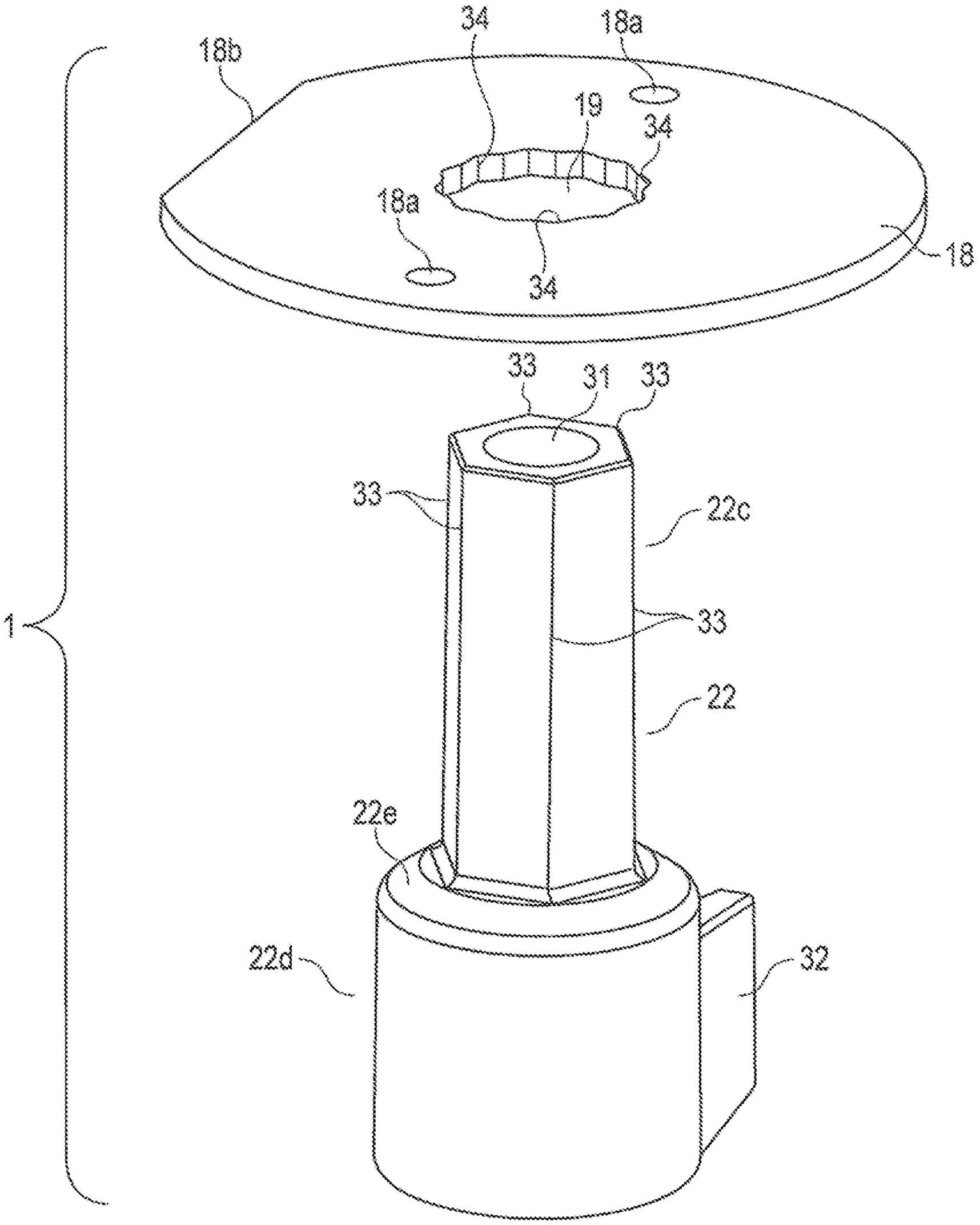

FIG. 4

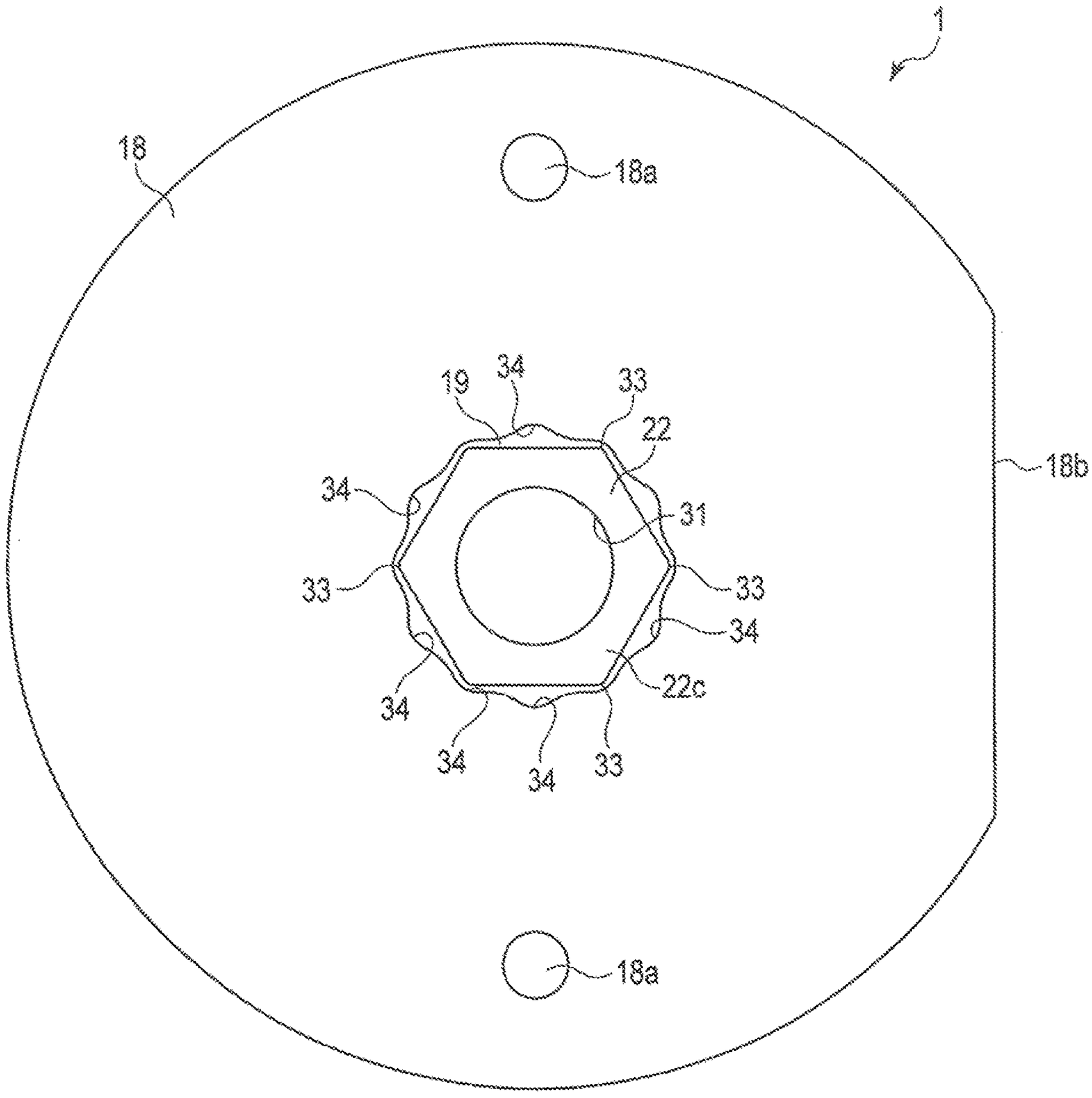

FIG. 5

ROTATION STOPPER FOR CYMBAL PAD

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is based upon and claims the benefit of priority from Japanese Patent Application No. 2018-004434, filed Jan. 15, 2018; the entire contents of which are incorporated herein by reference.

BACKGROUND

1. Field

The present invention relates to a rotation stopper for deterring a cymbal pad from rotationally moving while an electronic drum set is being played.

2. Description of the Related Art

Cymbal pads of an electronic drum set have a built-in sensor such as a piezoelectric element that converts vibrations generated by a strike with a stick into an electric signal. Output cables for extracting electric signals detected through the sensor are connected to the cymbal pads. Accordingly, a structure for prohibiting the cymbal pad from rotationally moving (hereinafter referred to as a rotation stopper) is necessary for preventing a problem of directly striking immediately above the sensor and a problem of the output cables getting tangled or being disconnected.

For example, in a known rotation stopper, a wedge-shaped recessed portion on the cymbal pad side is put on an end portion projecting in a wedge shape on a cymbal stand side. However, since such a rotation stopper has a structure in which the wedge-shaped recessed portion loosely engages with the wedge-shaped end portion, the way the cymbal pad swings when struck varies in the circumferential direction of the cymbal pad.

Specifically, if this rotation stopper is used, the cymbal pad does not easily swing in a direction along a ridge of the end portion. In other words, compared with a metallic cymbal of an acoustic drum set (hereinafter referred to as an acoustic cymbal), a movement of the cymbal pad when struck with a stick varies depending on the position of the strike along the circumferential direction of the cymbal pad.

Accordingly, compared with an acoustic cymbal, it is difficult to delicately strike the cymbal pad with a subtle change in strength, and the way the cymbal pad swings when strongly struck varies depending on the position of the strike. Therefore, it is difficult to reproduce a realistic feeling of striking an acoustic cymbal.

SUMMARY

An aspect of the present invention is to provide a rotation stopper for a cymbal pad capable of reproducing a realistic feeling of striking an acoustic cymbal.

The rotation stopper for the cymbal pad according to an embodiment of the present invention has a holding hole provided in the cymbal pad and an axis member provided on a cymbal stand. The axis member is arranged to be inserted through the holding hole with an amount of play in the fitting. The holding hole has a plurality of first engaging portions on the inner periphery. The axis member has an outer peripheral surface having at least one second engaging portion that engages with at least one of the first engaging portions so as to deter the cymbal pad from rotationally moving relative to the cymbal stand.

With the rotation stopper for the cymbal pad according to the embodiment of the present invention, it is possible to reproduce a realistic feeling of striking an acoustic cymbal.

Additional aspects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the invention, and together with the general description given above and the detailed description of the embodiments given below, serve to explain the principles of the invention.

FIG. **1** is a perspective view of a cymbal pad according to an embodiment seen from diagonally above.

FIG. **2** is a perspective view of the cymbal pad of FIG. **1** seen from diagonally below.

FIG. **3** is a cross-sectional view of the cymbal pad of FIG. **2** taken along line F**3**-F**3**.

FIG. **4** is an exploded perspective view showing a rotation stopper for the cymbal pad of FIG. **1**.

FIG. **5** is a plan view of the rotation stopper of FIG. **4** seen from the axial direction.

DETAILED DESCRIPTION

An embodiment of the present invention will be described with reference to the drawings.

FIG. **1** is a perspective view of a cymbal pad **10** having a rotation stopper **1** (see FIG. **4**) according to the embodiment seen from diagonally above, and FIG. **2** is a perspective view of the cymbal pad **10** seen from diagonally below. The cymbal pad **10** is attached to the distal end of the cymbal stand. FIG. **2** partially shows only a supporting rod **20** at the distal end of the cymbal stand, and FIG. **1** does not show the cymbal stand. FIG. **3** is a cross-sectional view of the cymbal pad **10** of FIG. **2** attached to the cymbal stand, taken along line F**3**-F**3**.

In addition to the slim supporting rod **20** to which the cymbal pad **10** is attached, the cymbal stand has a supporting pole (not shown) vertically extending with the supporting rod **20** at the upper end, an adjusting mechanism (not shown) for adjusting the length of the supporting pole, a leg (not shown) for standing the supporting pole on the floor, a frame (not shown) for attaching the supporting pole, etc. The supporting rod **20** may be integrally provided at the upper end of the supporting pole. A cymbal stand may have a boom (not shown) arranged between the supporting pole and the supporting rod **20** and extended from the upper end of the supporting pole in a lateral direction. At the upper end of the supporting pole and at the end of the boom, an adjusting mechanism (not shown) for adjusting the angle of the supporting rod **20** may be provided.

Various types of cymbals may be used as a cymbal including a cymbal pad and an acoustic cymbal in a drum set including an electronic drum set and an acoustic drum set. For example, a cymbal described herein includes a hi-hat cymbal, a ride cymbal, a crash cymbal, etc. In other words,

the rotation stopper **1** of the present embodiment is applicable to any of such various types of cymbals.

As shown in FIG. **3**, the outer peripheral surface near the upper end of the supporting rod **20** of the cymbal stand is threaded to be screwed together with a wing nut **21**. The diameter of the supporting rod **20** decreases toward its upper end in a stepwise manner, and the supporting rod **20** has annular steps **20***a* and **20***b* at the positions where the diameter changes. In the present embodiment, the steps **20***a* and **20***b* are arranged at two positions on the outer peripheral surface which are apart from each other along the longitudinal direction of the supporting rod **20**.

To the supporting rod **20**, an approximately cylindrical holding sleeve **22** is attached from the upper end side of the supporting rod **20**, and then the approximately discoid cymbal pad **10** is attached. Subsequently, the wing nut **21** is screwed into the upper end of the supporting rod **20** with a felt washer **24***a* and a washer **24***b* interposed between an upper end of the holding sleeve **22** and the wing nut **21**. As a result, the cymbal pad **10** is attached to the supporting rod **20** in such a manner that the cymbal pad **10** can slightly swing relative to the supporting rod **20**. The felt washer **24***a* may be formed by other materials.

The holding sleeve **22** is attached to the position to cover the step **20***b*, which is the upper one of the two steps **20***a* and **20***b* of the supporting rod **20**. On the inner peripheral surface of the holding sleeve **22**, a step **22***a* to be engaged with the step **20***b* is provided. When the holding sleeve **22** is attached from the upper end side of the supporting rod **20**, the step **22***a* of the holding sleeve **22** engages with the step **20***b* of the supporting rod **20** so that the holding sleeve **22** is held at the position.

The holding sleeve **22** is fixed to the supporting rod **20** at this position by a screw **23** shown in FIG. **2**. The holding sleeve **22** has a screw hole **22***b* orthogonal to the axial direction and connecting the outer peripheral surface and the inner peripheral surface of the holding sleeve **22**. By screwing the screw **23** into the screw hole **22***b* of the holding sleeve **22**, the distal end of the screw **23** is pressed against the outer peripheral surface of the supporting rod **20** so as to fix the holding sleeve **22** to the supporting rod **20**. As a result, the holding sleeve **22** becomes unable to rotationally move relative to the cymbal stand.

The holding sleeve **22** has a small-diameter portion **22***c* with a relatively small outer diameter, and a large-diameter portion **22***d* with a relatively large outer diameter. The shoulder portion **22***e*, which is between the small-diameter portion **22***c* and the large-diameter portion **22***d*, inclines outwardly from the lower end of the small-diameter portion **22***c* toward the upper end of the large-diameter portion **22***d*. The shoulder portion **22***e* is provided on the outer peripheral surface of the holding sleeve **22** at a height position which is approximately the same as the step **22***a* provided on the inner peripheral surface of the holding sleeve **22**. The shoulder portion **22***e* abuts against the holding plate **18** (described later) in a state where the cymbal pad **10** is attached to the holding sleeve **22**.

As shown in FIG. **3**, the cymbal pad **10** has an approximately discoid main body plate **12**, a frame **14** provided at the center of the underside of the main body plate **12**, a cover member **16** that covers the surface of the main body plate **12**, and the approximately discoid holding plate **18** that functions as the rotation stopper **1** for the cymbal pad **10** in cooperation with the aforementioned holding sleeve **22** on the cymbal stand side. FIG. **3** shows a state where the cymbal pad **10** slightly inclines relative to the supporting rod **20** of the cymbal stand.

The main body plate **12** is made of, for example, a hard resin such as ABS and polycarbonate. The main body plate **12** has, at its center, a round insertion hole **12***a* through which the holding sleeve **22** can be inserted. The main body plate **12** may be formed into a plane discoid shape, or may be slightly curved. In the present embodiment, the main body plate **12** is slightly and downwardly curved from the center toward the outer peripheral edge.

The frame **14** is fixed to the underside of the main body plate **12** in a coaxial manner. The frame **14** is made of, for example, the same material as the main body plate **12**. On its bottom surface shown in the drawing, the frame **14** has an approximately cylindrical recess **14***a* for accommodating a holding plate **18**. A bottom wall **14***b* of the recess **14***a* is in contact with the underside of the main body plate **12**. The recess **14***a* is recessed toward the underside of the main body plate **12** upwardly as shown in the drawing.

On the bottom wall **14***b* of the recess **14***a*, an insertion hole **14***c* through which the holding sleeve **22** can be inserted is provided. The edge of the insertion hole **14***c* inclines inwardly so as to decrease the diameter of the insertion hole **14***c* from the insertion hole **12***a* of the main body plate **12** toward the edge of a holding hole **19** (described later) (see FIG. **4**) of the holding plate **18**. The smallest inner diameter of the insertion hole **14***c* is smaller than the outer diameter of the large-diameter portion **22***d* of the holding sleeve **22**.

The cross section of the peripheral wall of the recess **14***a* is in a D-shape, which matches the shape of the holding plate **18**, at least at the position adjacent to the bottom wall **14***b* (not shown). Two screw holes (not shown) corresponding to two insertion holes **18***a* (FIG. **4**) of the holding plate **18** are provided on the bottom wall **14***b* of the recess **14***a*. The holding plate **18** is fixed to the frame **14** and becomes unable to rotationally move by aligning a D-shaped notch **18***b* (FIG. **4**), arranging the holding plate **18** in the recess **14***a*, and fixing the holding plate **18** to the bottom wall **14***b* of the recess **14***a* with screws. It is possible to provide three or more of sets of the insertion hole **18***a* of the holding plate **18** and the screw hole on the bottom wall **14***b* of the recess **14***a*.

On the outside of the recess **14***a*, the frame **14** has an approximately annular accommodating part **14***d* that is closed between the frame **14** and the underside of the main body plate **12**. A piezoelectric element and a wiring for the piezoelectric element (not shown) are arranged inside the accommodating part **14***d*. The piezoelectric element is attached to the main body plate **12**, and converts vibrations of the main body plate **12** into an electric signal. The piezoelectric element may be provided at a position closer to the outer peripheral edge of the main body plate **12** than the accommodating part **14***d*.

As shown in FIG. **2**, the accommodating part **14***d* has a projecting portion **14***e* protruding in a rectangular shape on one side of a radial direction. A substrate and a connector (not shown) are arranged in this projecting portion **14***e*. An end face **14***f* of the projecting portion **14***e* is provided with two insertion holes **14***g* through which a plug (not shown) of an output cable (not shown) is inserted to be plugged into the connector (not shown). The output cable is electrically connected to the piezoelectric element via the plug and the connector, and takes out electric signals detected by the piezoelectric element.

As shown in FIGS. **2** and **3**, the cover member **16** is provided on the top surface side of the main body plate **12** to enfold the outer peripheral edge of the main body plate **12**. The cover member **16** has a shape in which an edge portion **16***a* near the outer peripheral edge of the main body plate **12**

and a cup portion **16***b* near the holding sleeve **22** are smoothly and integrally connected.

In a different type of cymbal pad (e.g., a pad for a ride cymbal), the cover member **16** may have a step or a line as a mark between the edge portion **16***a* and the cup portion **16***b*.

A membrane switch (not shown) for muting the sound of the cymbal pad is provided on the main body plate **12** along the edge portion **16***a*. The membrane switch is a switch turned on by a player pinching the edge of the cymbal pad **10** with fingers. The sound of the cymbal is muted by pressing this switch after striking the cymbal pad **10**.

Most of the cover member **16** including the edge portion **16***a* is closely attached to the top surface of the main body plate **12**. The cup portion **16***b* is formed into a domed shape curving and gradually separated from the top surface of the main body plate **12** toward the center of the main body plate **12**. An insertion hole **16***c*, through which the holding sleeve **22** can be inserted and of which a diameter is larger than the diameter of the felt washer **24***a*, is provided at the center of the cup portion **16***b*.

The cover member **16** is made of rubber or synthetic resin. The cover member **16** and the main body plate **12** adhered to each other have a rigidity equivalent to an acoustic cymbal. A surface material for realizing a slip equivalent to an acoustic cymbal upon a strike with a stick may be applied on the surface of the cover member **16**. By appropriately selecting the materials of the main body plate **12** and the cover member **16** and the surface material, the feeling of striking the cymbal pad can be made closer to the feeling of striking an acoustic cymbal.

A solid spacer **17** is provided between the cup portion **16***b* of the cover member **16** and the main body plate **12**. The spacer **17** is formed into an approximately annular shape having an insertion hole **17***a* at the center. A membrane switch (not shown) is provided between the top surface (shown in the drawing) of the spacer **17** and the cup portion **16***b*. The membrane switch detects a strike on the cup portion **16***b*.

On the edge of the insertion hole **17***a* of the spacer **17**, an annular projection **17***b* projecting through the insertion hole **16***c* of the cup portion **16***b* upwards as shown in the drawing is provided. The inner diameter of the insertion hole **17***a* extending inside the annular projection **17***b* is larger than the inner diameter of the insertion hole **12***a* of the main body plate **12**, and slightly larger than the outer diameter of the felt washer **24***a*. As shown in FIG. **3**, if the cymbal pad **10** inclines relative to the supporting rod **20** of the cymbal stand, the felt washer **24***a* is pressed against the inner surface of the annular projection **17***b* of the spacer **17** and deformed.

The cymbal pad **10** having the above structure is used while the output cable is connected. Accordingly, it is necessary to take measures to prevent a rotational movement of the cymbal pad **10** in order to prevent the plug of the output cable from being disconnected from the connector of the cymbal pad **10** due to a rotational movement of the cymbal pad **10** while the cymbal pad **10** is played.

As shown in FIG. **1**, the cover member **16** of the cymbal pad **10** has a fan-shaped portion **15**. The fan-shaped portion **15** is provided at the position to overlap with the projecting portion **14***e* (FIG. **2**) of the frame **14**. The cymbal pad **10** is attached to the cymbal stand in such a direction that the fan-shaped portion **15** is arranged away from the player. In other words, the optimum position to be struck is set on the side opposite from the fan-shaped portion **15**, and a rotational movement of the cymbal pad **10** is prohibited so that the player strikes the optimum position with a stick.

The rotation stopper **1** according to the present embodiment will be described in detail with reference to FIGS. **4** and **5**. FIG. **4** is a perspective view showing the holding plate **18** and the holding sleeve **22** (the axis member) of the rotation stopper **1** in a separate manner. FIG. **5** is a plan view of the rotation stopper **1** seen from the axial direction. In the rotation stopper **1** of FIG. **5**, the holding sleeve **22** is arranged to be inserted through the holding hole **19** of the holding plate **18**. As shown in FIG. **5**, the holding sleeve **22** (the small-diameter portion **22***c*) is inserted through the holding hole **19** of the holding plate **18** with a moderate amount of play.

In the present embodiment, the small-diameter portion **22***c* of the holding sleeve **22** is formed into a regular hexagonal column, and a long hole **31** for inserting the supporting rod **20** of the cymbal stand is formed at the center of the holding sleeve **22**. The cross section of the small-diameter portion **22***c* orthogonal to the central axis is a regular hexagon. A boss section **32** having a screw hole **22***b* (FIG. **2**) is provided on the large-diameter portion **22***d* of the holding sleeve **22** in a protruding manner. The screw **23** for fixing the holding sleeve **22** to the supporting rod **20** is screwed into the screw hole **22***b*.

On the outer peripheral surface of the small-diameter portion **22***c* of the holding sleeve **22**, six ridges **33** (second engaging portions) are provided. The ridges **33** are arranged at even intervals in the circumferential direction, and are parallel to each other. In the present embodiment, the small-diameter portion **22***c* is formed into a regular hexagonal column; however, the configuration is not limited thereto. The number, the angle, and the shape of the ridges **33** may be changed discretionarily. For example, the cross section of the small-diameter portion **22***c* may be formed into other regular polygons such as a regular pentagon and a regular octagon. Alternatively, the ridges **33** may be arranged at uneven intervals in the circumferential direction of the small-diameter portion **22***c*. The small-diameter portion is only required to have at least one ridge **33**.

The holding plate **18** has, at its center, the holding hole **19** for inserting the small-diameter portion **22***c* of the holding sleeve **22**, in addition to the aforementioned two insertion holes **18***a* and the notch **18***b*. In the present embodiment, the holding hole **19** has a shape formed by overlapping two holes shifted at 30 degrees relative to each other. Each of the two holes is a size larger than the outer diameter of the small-diameter portion **22***c* of the holding sleeve **22**, and has a regular hexagonal cross section. In other words, in the present embodiment, 12 engaging recesses **34** (first engaging portions) engageable simultaneously with all of the six ridges **33** of the holding sleeve **22** are provided on the inner periphery of the holding hole **19**.

These plurality of engaging recesses **34** are arranged at even intervals along the inner periphery of the holding hole **19**. The plurality of engaging recesses **34** of the present embodiment have a shape formed by smoothly connecting engaging recesses **34** adjacent to each other in the circumferential direction. In other words, the plurality of engaging recesses **34** of the present embodiment have a shape formed by alternately connecting inwardly-projecting curved surfaces with outwardly-projecting curved surfaces. On the other hand, the ridge **33** of the small-diameter portion **22***c* of the holding sleeve **22** does not necessarily have an angular edge, and may have a rounded edge that forms a curved surface.

The number of the engaging recesses **34** may be set in accordance with the number of the ridges **33** as in the present embodiment, and may be set to a number unrelated to the

number of the ridges **33**. In the present embodiment, the number of the engaging recesses **34** is set to twice the number of the ridges **33**. For example, the number of the ridges **33** may be four, and the number of the engaging recesses **34** may be 12 which is three times the number of the ridges **33**. It is desirable that the number of the engaging recesses **34** is an integral multiple of the number of the ridges **33**. By setting the number of the engaging recesses **34** to an integral multiple of the number of the ridges **33**, the attaching angle of the holding sleeve **22** relative to the holding plate **18** can be finely adjusted, and all of the ridges **33** of the holding sleeve **22** can be engaged with the engaging recesses **34** of the holding hole **19**. As a result, the ridges **33** and the engaging recesses **34** can be securely engaged with each other.

In contrast, the cymbal pad **10** needs to be swingable relative to the supporting rod **20**, and thus the small-diameter portion **22***c* of the holding sleeve **22** needs to be loosely inserted through the holding hole **19** of the holding plate **18**. Furthermore, it is desirable that the cymbal pad **10** cannot rotationally move relative to the supporting rod **20** while being played under usual conditions, but rotationally moves relative to the supporting rod **20** if forced to rotationally move by the player. In this manner, the cymbal pad **10** can rotationally move relative to the supporting rod **20** if forced to rotationally move, which can prevent the supporting rod **20** and the cymbal pad **10** itself from breaking.

To achieve this, in the present embodiment, the size of the holding hole **19** of the holding plate **18** is set in such a manner that the holding plate **18** cannot rotationally move relative to the small-diameter portion **22***c* of the holding sleeve **22**, and that there is a moderate amount of play between the holding hole **19** and each ridge **33** of the small-diameter portion **22***c*. In the present embodiment, the holding plate **18** in which the holding hole **19** is formed is made of a material softer than the holding sleeve **22**. The above moderate amount of play between the holding hole **19** and each ridge **33** of the small-diameter portion **22***c* is set to the extent that the holding plate **18** can rotationally move relative to the small-diameter portion **22***c* accompanied by deformation of the holding plate **18**. Accordingly, the holding plate **18** may be changed if the holding plate **18** is worn out, which realizes a low maintenance cost.

As described above, according to the present embodiment, the small-diameter portion **22***c* of the holding sleeve **22** fixed to the supporting rod **20** of the cymbal stand is inserted through the holding hole **19** of the holding plate **18** that is fixed to a cymbal pad **10** with an amount of play. This enables the cymbal pad **10** to swing evenly without variation in the circumferential direction upon being struck with a stick, similarly to an acoustic cymbal. Thus, according to the present embodiment, a realistic feeling of striking an acoustic cymbal can be reproduced.

Furthermore, according to the present embodiment, since the rotation stopper **1** is arranged between the cymbal pad **10** and the cymbal stand, it is possible to prevent the cymbal pad **10** from undesirably moving rotationally relative to the supporting rod **20** when the cymbal pad **10** is struck with a stick. Therefore, according to the present embodiment, there is no possibility of causing a problem of directly striking the piezoelectric element due to the cymbal pad **10** deviating from the normal position and rotationally moving, or of causing a problem in which the plug of the output cable is disconnected from the connector of the cymbal pad **10**.

Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details and representative embodiment shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

For example, the above embodiment describes the case where a structure for prohibiting the cymbal pad **10** from moving rotationally is arranged between the holding sleeve **22** to be fixed to the supporting rod **20** of the cymbal stand and the holding hole **19** of the holding plate **18** to be fixed to the cymbal pad **10**. However, the configuration is not limited thereto; the rotation stopper of the present invention may be arranged between the recess **14***a* of the frame **14** of the cymbal pad **10** and the holding plate **18**. In this case, the holding plate **18** may be fixed to the supporting rod **20** of the cymbal stand.

Moreover, the above embodiment describes the case where the holding plate **18** having the holding hole **19** is arranged on the cymbal pad **10** side, and the supporting rod **20** to be inserted through the holding hole **19** is arranged on the cymbal stand side. However, the configuration is not limited thereto; the holding hole **19** may be arranged on the cymbal stand side, and the supporting rod **20** may be arranged on the cymbal pad **10** side.

The invention claimed is:

1. A rotation stopper for a cymbal pad comprising:

a holding hole provided in one of a cymbal stand or the cymbal pad and including a plurality of first engaging portions arranged at even intervals in a circumferential direction on an inner periphery of the holding hole; and

an axis member provided on another one of the cymbal stand or the cymbal pad, the axis member including a small diameter portion, a large diameter portion that is larger than the small diameter portion, and a shoulder portion between the small diameter portion and the large diameter portion, the shoulder portion inclines outwardly from a lower end of the small diameter portion toward an upper end of the large diameter portion, the small diameter portion is arranged to be inserted through the holding hole such that the holding plate sits on the shoulder portion with an amount of play therebetween, the axis member having a cross section of a regular polygon of which all of apex angles function as second engaging portions engaging with the first engaging portions, and engaging the second engaging portions with the first engaging portions so as to deter the cymbal pad from rotationally moving relative to the cymbal stand,

wherein a number of the first engaging portions is an integral multiple of a number of the second engaging portions.

2. The rotation stopper according to claim **1**, wherein a member in which the holding hole is provided is made of a material softer than a material of the axis member.

3. A rotation stopper for a cymbal pad comprising:

a holding plate provided on one of a cymbal stand or the cymbal pad in an exchangeable manner and having a holding hole that includes a plurality of first engaging portions on an inner periphery of the holding hole; and

an axis member provided on another one of the cymbal stand or the cymbal pad, the axis member including a small diameter portion, a large diameter portion that is larger than the small diameter portion, and a shoulder portion between the small diameter portion and the large diameter portion, the shoulder portion inclines outwardly from a lower end of the small diameter portion toward an upper end of the large diameter

portion, the small diameter portion is arranged to be inserted through the holding hole such that the holding plate sits on the shoulder portion with an amount of play therebetween, and including;

one or more second engaging portions configured to engage with at least one of the first engaging portions so as to deter the cymbal pad from rotationally moving relative to the cymbal stand,

wherein the holding plate is made of a material softer than a material of the axis member.

4. The rotation stopper according to claim **3**, wherein the axis member comprises the second engaging portions of at least two or more that are configured to engage with the first engaging portions of at least two or more.

5. The rotation stopper according to claim **4**, wherein a shape of a cross section of the axis member is a regular polygon of which all of apex angles function as the second engaging portions.

6. The rotation stopper according to claim **5**, wherein the first engaging portions are arranged at even intervals in a circumferential direction of the holding hole, a number of the first engaging portions being an integral multiple of a number of the second engaging portions.

7. A rotation stopper for a cymbal pad comprising:

a holding hole provided in one of a cymbal stand or the cymbal pad and including a plurality of first engaging portions on an inner periphery of the holding hole; and

an axis member provided on another one of the cymbal stand or the cymbal pad, the axis member including a small diameter portion, a large diameter portion that is larger than the small diameter portion, and a shoulder portion between the small diameter portion and the large diameter portion, the shoulder portion inclines outwardly from a lower end of the small diameter portion toward an upper end of the large diameter portion, the small diameter portion is arranged to be inserted through the holding hole such that the holding plate sits on the shoulder portion with an amount of play therebetween, and the axis member including one or more second engaging portions configured to engage with at least one of the first engaging portions so as to deter the cymbal pad from rotationally moving relative to the cymbal stand,

wherein a member in which the holding hole is provided is made of a material softer than a material of the axis member, and the play is in a size that enables the cymbal pad to rotationally move relative to the cymbal stand accompanied by deformation of the member in which the holding hole is provided.

8. The rotation stopper according to claim **7**, wherein the axis member comprises the second engaging portions of at least two or more that are configured to engage with the first engaging portions of at least two or more.

9. The rotation stopper according to claim **8**, wherein a shape of a cross section of the axis member is a regular polygon of which all of apex angles function as the second engaging portions.

10. The rotation stopper according to claim **9**, wherein the first engaging portions are arranged at even intervals in a circumferential direction of the holding hole, a number of the first engaging portions being an integral multiple of a number of the second engaging portions.

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 10,672,370 B2
APPLICATION NO. : 16/246830
DATED : June 2, 2020
INVENTOR(S) : Akito Takegawa et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Title Page

Item (73) Assignee:, please change "Pearl Musical Instruments Co. (JP)" to --Pearl Musical Instrument Co. (JP)--

Signed and Sealed this
Seventeenth Day of November, 2020

Andrei Iancu
Director of the United States Patent and Trademark Office